

Artificial smoke generators are used in the certification of aircraft smoke detectors. However, there is currently no standardization concerning the use of these generators and their smoke transport. Verifying which artificial smoke generators produce an aerosol with similar particle characteristics to smoke is essential for the implementation of false alarm resistant detectors in aircraft. There is ongoing work led by the FAA to define a set of requirements for smoke generator qualification. Standardizing the artificial smoke generators for the total quantity of aerosol production, rate of aerosol production, and repeatability of aerosol production and quantifying the effects of the ambient environment is necessary to ensure the reliability and integrity of the inflight smoke detection certification test. It was found that changing the gas propellant pressure, the gas propellant, and the heater wattage affected the smoke generator volumetric flow rate. The heater wattage was the most significant easily adjustable parameter in the volumetric flow rate. Large-scale tests inside an aircraft cargo compartment showed increasing the volumetric flow rate decreased detection time. The small-scale measurements of the volumetric flow rate can help determine the smoke transport and detection time.

A comparison of four major airframe manufacturers' smoke generators and settings identified their performance. Aircraft Certification Offices have approved these smoke generators and settings as acceptable means of compliance for smoke generation methods for certifying cargo smoke-detection systems. Large-scale tests showed that different settings of smoke generators could significantly affect detection time for in-flight smoke detection certification testing. The standardization attempt serves to equalize the settings and performance.